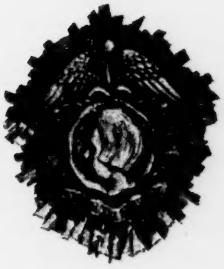
Journal of Dentistry for Children



SECOND QUARTER 1950

Journal of Dentistry for Children

PUBLISHED BY THE AMERICAN SOCIETY
OF DENTISTRY FOR CHILDREN

ALFRED E. SEYLER, D.D.S., F.A.C.D., *Editor*
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The Palatal Crib for the Correction of Oral Habits

MAURY MASSLER, D.D.S., M.S.
and
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University of Illinois, College of Dentistry, Chicago 12, Illinois

Introduction

Habits in Children. Habits in children are many and varied. In 1929, Olson reviewed the literature and made an inventory of habits into the following groupings:

1. Oral. (Sucking thumb, sucking fingers, biting nails, protruding tongue.)
2. Nasal. (Picking nose, scratching nose, wrinkling nose.)
3. Hirsutal. (Pulling and twisting hair, scratching head.)
4. Irritational. (Scratching body.)
5. Manual. (Picking fingers, writhing hands, clenching fists.)
6. Ocular. (Rubbing eyes, blinking eyelids, winking.)
7. Aural. (Pulling ear, picking ear.)
8. Genital. (Manipulating genitalia, thigh rubbing.)
9. Facial. (Grimacing, twitching muscles.)

Olson (1929) carefully recorded these mannerisms in a group of grade-school children and found that oral habits occurred with great frequency. The following table from Olson (1929) states the relative frequency of "nervous habits" observed in his group of 459 grade-school children:

	Frequency of Habit Action
Oral Habits	247
Nasal Habits	127
Hirsutal Habits	105
Ocular Habits	69
Aural Habits	48
Genital Manipulations	17
Habit Actions Exhibited by 459 Children	613

Oral Habits. Oral habits thus constitute a major portion of the various tics and mannerisms to which the child is subject. The most common oral habits are: (1) thumb and finger-sucking, (2) nail-biting, (3) lip-biting, (4) lip and tongue-sucking and (5) tongue-thrusting. Many habits are merely tension-relieving mechanisms.

Some of these habits (i.e. thumbsucking) have been shown to be damaging to the developing, mixed or permanent dentitions, while others (i.e., nail-biting) are not so damaging. The biting habits, nail-biting and lip-biting, do not often interfere with the normal eruption of the teeth and proper occlusion. However, sucking habits such as thumbsucking, lip-sucking, tongue-sucking and tongue-thrusting have been frequently implicated as factors which may cause malocclusion of the teeth in children.

Correction of Oral Habits. Habits should never be corrected by chiding or other punitive measures. In fact, such methods seldom succeed. Correction of oral habits that might interfere with the proper development of the occlusion is best accomplished by some intra-oral device. An intra-oral device for the correction of oral habits must fulfill certain requirements: (1) it must not be punitive, (2) it must unobtrusively interfere with the successful execution of the "habit" action and thus bring the act from the level of the subconscious into the conscious, (3) it must be persistent (but gentle) in its action so that the act cannot be performed successfully even during sleep, (4) it must be clean and non-injurious to the oral tissues and (5) it must be acceptable to the patient.

The palatal crib most successfully satisfies these requirements in the correction of persistent thumbsucking, lip-sucking and tongue-thrusting habits. This appliance (or device) has been described by teachers of pedodontics and orthodontics (Teuscher, 1940; Brauer, et al, 1947). However, it is such a simple yet effective means of intercepting incipient malocclusions caused by persistent oral habits that it merits review again by the pedodontist.

The Thumbsucking Habit

Thumbsucking is the most common as well as the most obvious of all the mouth habits during infancy and early childhood. (Olson, 1929). Constant repetition of the act, no matter what the cause or its significance, ultimately resolves it from a purposeful act into an unconscious "habit." Each time the act of thumbsucking is practiced and the child derives pleasure or satisfaction from the act, he becomes less and less conscious of it. When it is repeated often enough, the act becomes relegated to the subconscious and is then termed a habit (Bakwin and Bakwin, 1942). The cause and significance of thumbsucking have often been discussed. A detailed discussion of thumbsucking, its significance at different age levels as well as the fundamental principles involved in the treatment of thumbsucking, has been presented by Massler and wood (1949).

The Thumbsucking Habit as a Cause of Malocclusion. It has been established clinically, and generally accepted, that fingersucking may be an important factor in the production of malocclusion, particularly during the period of active eruption of the permanent anterior teeth (Lewis, 1930; Langford, 1939; Spencer, 1941). The specific effect of thumbsucking will depend largely upon the:

(a) Stage of eruption of the teeth
(b) Vigor of the sucking habit
(c) Duration of the sucking habit
(d) Method of sucking the fingers.

Correction of Thumbsucking. The effects of thumbsucking may be disastrous to the occlusion of the child over six years of age (Massler and Wood, 1949). Therefore, interception must often be practiced when a better method of removing the cause for thumbsucking is impossible or impractical (Massler and Wood, 1949). Correction of thumbsucking is almost always indicated during the mixed dentitional period (6 to 12 years). If damage is apparent in the primary dentition, individual judgment must decide whether the damage is transitory and may be ignored or might be permanent and should therefore be prevented (Massler and Wood, 1949). Use of the appliance in children under three years of age is very rarely indicated.

Treatment of the habit must be accompanied by a sympathetic approach to the child's problem. This is much more effective than nagging or scolding, which serve only to fix the habit with an underlying sense of guilt. Specific treatment is, of course, an individual problem. To properly motivate the child to *want* help in correcting the habit requires ingenuity, wisdom, sympathy and understanding of the fundamental factors involved in the causation of thumbsucking. Thumbsucking cannot be corrected by any one given formula. Some children respond quickly to simple means of correction, while with others the task proves discouraging. The problem must be attacked by bringing it out of the realm of the subconscious into the conscious. *Most important, the full cooperation of the child must be won.* A non-cooperative, resentful child can easily overcome the barriers of the most bitter substances and painful thumb-guards. A thorough understanding of the problem and appreciation of the psychologic implications involved in thumbsucking are therefore essential to the successful management of the thumbsucker and treatment of thumbsucking.

Purpose and Action of the Palatal Crib. The purpose of the palatal crib is twofold: first, to remind the child and make him aware that he is sucking his thumb and second, to prevent the formation of the vacuum essential to the act of sucking. A constant but nonpunitive reminder will soon bring the habit from the level of the subconscious to his conscious attention. The palatal crib acts by preventing the formation of a vacuum by the tongue when the finger is sucked. (Fig. A.) The success of the appliance lies in the fact that suction becomes impossible and only air is drawn into the mouth. The act, therefore, becomes futile and is soon discontinued.

An intra-oral appliance of this type is far more effective than are thumb-guards, spikes or bitter substances. These latter are "punishment" while an intra-oral appliance of the crib type is not. In fact, children seek its use as "braces" for the teeth. Cooperation of the child is, therefore, seldom lacking.

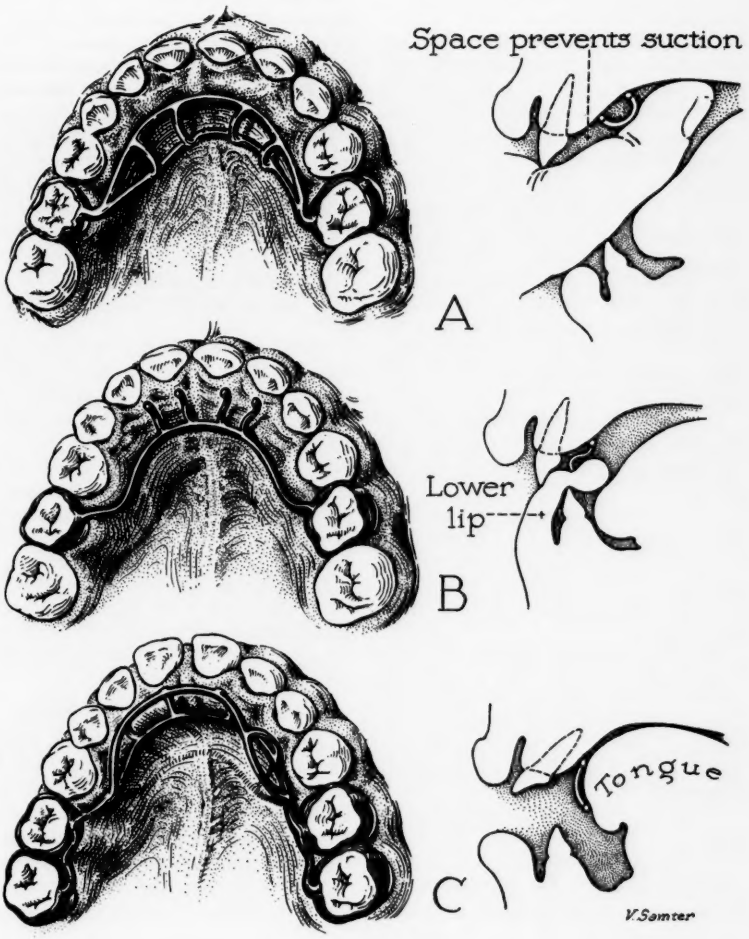

Figure A—Palatal crib for the correction of thumb or finger-sucking.

Figure B—Appliance to remind the child and discourage lip-sucking.

Figure C—Palatal crib to correct tongue-thrusting. Four molars are banded for anchorage.

Construction of the Palatal Crib

Materials:

Two pieces of 0.025 inch gold wire, each two inches in length; 2½ inches of 0.045 inch gold wire; gold solder and soldering equipment; band material (gold) for posterior teeth; band forming pliers; impression tray; compound and investment.

Procedure:

1. Pinch the bands on the upper second primary molars or first permanent molars, if the latter are fully erupted into the oral cavity. Pinch the bands on the *buccal* side of the teeth and solder. The bands are pinched on the buccal side since the crib is attached to the palatal surface of the bands. Allow the buccal tags to remain and become embedded in the impression material.

2. After soldering, place the bands back on the respective teeth and take an impression of the whole arch in compound or alginate material.

3. Remove the impression. The bands usually remain embedded in a compound impression, but may slip out of an alginate impression. If so, replace them accurately into the impression. The buccal tags help in this procedure.

4. Melt a small layer of pink wax on the inner aspect of only the palatal half of the band. This will facilitate the soldering of the wire to the band since the space between the investment and the band insulates and holds the heat instead of dissipating it through the investment.

5. Pour soldering investment into the impression.

6. Remove the impression material and carefully eliminate the wax on the inner aspect of the band with boiling water. Be sure that all the traces of wax are removed, since wax will interfere with the soldering operation.

7. Adapt one piece of 0.025 in. gold wire from one band to the other following the palate anteriorly as in Figure A. Begin the adaptation from the center of the wire at the midline of the palate and proceed laterally.

8. Bend the ends of the wire to make good contact with the band surface for at least 2 mm. up the palatal surface of the band (Figure A).

9. Bend the other piece of 0.025 in. gold wire in a similar way, but adapt this wire to the palate about 4-5 mm. posterior to the first one in the midline, as in Figure A. **Both wires should be tissue borne.** Solder the ends of both wires to the band.

10. Cut four pieces approximately 6-8 mm. long from the piece of 0.045 in. gold wire. Bend each piece into a slight curve. Fit each small piece across the two palatal wires with the curvature away from the palate by about 3/16 in.

11. Solder each piece of wire to the palatal wires spacing each piece as shown in Figure A.

12. Remove the crib from the investment cast. Cut the tags from the bands and file smooth. Pickle in acid; clean and polish the appliance. The appliance may be heat-treated, if necessary.

Precautions: The palatal crib should not be active. It should rest passively on the palate and against the bands to avoid any movement of the banded teeth. The palate should bear the entire brunt of the force exerted by the digit which is being sucked. If, in the case of a very vigorous thumbsucker, the palatal wires become embedded too deeply into the soft tissue, a plastic base may be added to the palatal surface of the crib.

Correction of Other Oral Habits

While thumb and finger-sucking are the most common and perhaps also the most injurious of all oral habits, other oral habits may be encountered, which because of their destructive effects on the occlusion also merit correction according to the principles already outlined. Lip-sucking and tongue-sucking are frequent transfers from a frustrated thumbsucking habit. Tongue-sucking may be seen in infants who have had their arms tied to prevent thumbsucking. Lip-sucking occurs more often in older children.

Abnormal tongue-thrusting during speech, swallowing or even at the rest position may either cause an anterior open-bite, or be the result of such a condition. In either case, the abnormal tongue-thrust should be corrected.

Lip-Sucking

The frustrated thumbsucker may become a lipsucker. In such cases, the child sucks the lower lip into the oral cavity behind the upper anterior teeth. The child may continue to suck vigorously or even bite upon the vermilion border of the lower lip. These cases are easily detected by the line of reddened and irritated skin below the vermilion border of the lower lip. Often tooth marks are visible. This habit may cause as marked a protrusion of the upper anterior teeth as does vigorous and prolonged thumbsucking.

The palatal crib designed for the thumbsucker can easily be modified to correct this habit, i.e. bring it to the conscious attention of the child. Instead of forming a wire crib, four to six small pieces of gold wire are soldered vertically to a single palatal bar. These wire spurs are placed parallel to the long axis of the upper incisors and then bent lingually (Fig. B). The ends may be sharpened just sufficiently to iritate but not to injure the sensitive vermilion border of the indrawn lower lip. Care should be taken to avoid interference with the occlusion. *Under all circumstances the child must be made to feel that this appliance is not punitive but only a method of reminding him of the habit.* Under all circumstances the appliance should be requested by the child and *never forced upon him against his will.*

Tongue-Thrusting

The origin of the tongue-thrusting habit is often obscure. In some cases, it may result from a previously existing anterior open bite. In others, the habit may itself cause a typical anterior open bite with protrusion of the upper incisors. Some authors relate a painful tonsillitis or pharyngitis as the origin of a tongue-thrusting habit, especially if the abnormal tongue-thrust occurs only during swallowing (Brauer, et al, 1947).

Various types of tongue-thrusting may be encountered. The three most common types of tongue-thrusting occur in (1) lisping (2) abnormal swallowing and (3) resting with tongue protruded.

Habitual thrusting of the tongue between the anterior teeth may occur in certain speech defects characterized by sibulence (lisping). More frequently, the thrusting of the tongue into the space between the anterior teeth may occur during swallowing. Since swallowing may take place as much as 150 times per hour and often with great vigor, it becomes obvious that early interception of such a habit is necessary to prevent the development of a severe anterior open bite with protrusion of the incisor teeth.

Passive thrusting of the tongue between the anterior teeth may occur when the mandible is brought into normal rest position. Children often sit for hours looking at movies or comics with the tongue partially protruded from the mouth. Such a habit may or may not interfere with the eruption and correct occlusion of the anterior teeth. The effects vary from person to person and at different ages. The habit is most injurious to the newly erupting incisors of the child between the ages of six and eight years.

The palatal crib described for the correction of thumb-sucking is easily modified to correct an abnormal tongue-thrust. The crib portion of the appliance is merely turned at ninety degrees to the palate as in Figure C. This vertical crib, acts as a guard to catch and hold the tip of the tongue and prevent its protrusion between the anterior teeth.

If the thrusting is performed with vigor, it may be necessary to use two molars on each side for anchorage (Figure C). This will tend to prevent movement of the banded molars by the tongue.

The appliance should be permitted to remain as long as the anterior open bite is present. If the normal labial muscular action is insufficient to mould the upper anterior teeth to correct position and thus to close the space, the case should be referred to the orthodontist.

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Nineteenth Annual Meeting

American Society of Dentistry for Children

ATLANTIC CITY, NEW JERSEY

October 27, 28, and 29, 1950

THE AMBASSADOR HOTEL

PROGRAM

FRIDAY, OCTOBER 27th—
8:00 P. M.—Meeting of Executive Council. W. James Taub, President, Presiding.

SATURDAY, OCTOBER 28th—
9:30 A. M. to 12 Noon—Meeting of Executive Council together with delegates from State Units. Hugo M. Kulstad, President-Elect, Presiding.

SATURDAY, OCTOBER 28th—
1:30 P. M. to 5:30 P. M.—Scientific Program. (Details under "Scientific Program.")

SUNDAY, OCTOBER 29th—
10:00 A. M. to 12:30 P. M.—Table Clinic Session. (Presenting 21 outstanding pedodontic table clinics.) (Details under "Table Clinic Session.")

SUNDAY, OCTOBER 29th—
2:00 P. M. to 5:30 P. M.—General Business Session and Election of Officers.

SUNDAY, OCTOBER 29th—
7:00 P.M.—Dinner (informal). Panel discussion of the "Forsyth-Massachusetts Project," to train auxiliary personnel for the practice of Dentistry for Children.

SPEAKERS—
In favor: Dr. Paul K. Losch, Associate Professor, Dental Pediatrics, School of Dental Medicine, Harvard University, Boston, Mass.
Opposed: Dr. J. Ben Robinson, Dean, Baltimore College of Dental Surgery, University of Maryland, Baltimore, Md.
Moderator: Dr. Gerald D. Timmons, Dean, School of Dentistry, Temple University, Philadelphia, Pa.
Members of the American Dental Hygienists Association will be with us and wives and Dental Assistants are cordially invited as well.
Program Committee: M. Michael Cohen, Raymond Werther, Harold R. Klein and Gertrude Tank, Chairman.
Local Arrangements Committee: Maxwell Fogel, Morris Kelner, Lawrence Burdge and John K. Heindel, Sidney I. Kohn, Co-Chairmen.
General Advisory Chairman: J. M. Wisan.

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Willard T. Hunnicutt, 302 Medical Arts Bldg., Atlanta, Ga., 1950
Stanley Brown, Ithaca, Mich., 1950
R. Mott Erwin, Jr., 613 Corbett Bldg., Portland 4, Ore., 1950
Henry M. Wilbur, 129 Broadway Ave., Louisville 2, Ky., 1951
Francis W. Summers, 662 South Western Ave., Los Angeles 5, Cal., 1951
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COMMUNITY DENTAL PROGRAMS

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1951—Allen O. Gruebbel, 9510 Harding Ave., Evanston, Ill.
*1950—William Demerrit, 3780 Wilshire Blvd., Los Angeles 5, Cal.

EDITORIAL AND PUBLICATIONS

1952—Joseph T. Hartsook
1951—Stanley C. Brown
1950—C. Ray Taylor

Delegate to Advisory Council for National Committee for the Mid-Century White House Conference on Children and Youth: David B. Ast.

American Society of Dentistry for Children

Annual Meeting

ATLANTIC CITY, NEW JERSEY

October 27, 28, and 29, 1950

THE AMBASSADOR HOTEL

SCIENTIFIC PROGRAM

Saturday, October 28th — 1:30 P.M. to 5:30 P.M.

FIRST SECTION

FILLINGS FOR PRIMARY TEETH

Chairman: Dr. Paul K. Losch, Associate Professor of Dentistry, Harvard University, Boston, Mass.
Essayist: Dr. George W. Teuscher, Professor of Pedodontics, Northwestern University, School of Dentistry, Chicago, Ill.
Subject: Amalgam Restorations.

Essayist: Dr. Harold Kane Addelston, Professor of Dentistry for Children, New York University, College of Dentistry, New York, N. Y.
Subject: Gold Inlays for the Primary Dentition.

SECOND SECTION

PULP TREATMENT FOR CHILDREN

Chairman: Joseph J. Obst, M.A., D.D.S., F.A.P.H.A., Brooklyn, N. Y. President, New York State Society of Dentistry for Children.

Essayist: Dr. S. N. Rosenstein, Professor of Dentistry, Department of Pedodontics, Columbia University School of Dentistry, New York, N. Y.
Subject: Conservation of Children's Teeth with Exposed Pulps.

Essayist: Helmut A. Zander, D.M.D., D.D.S., M.S., Boston, Mass.
Subject: Indications for Pulpotomy in Children.

Biography: D.M.D., University of Wuerzburg; D.D.S., Northwestern University Dental School, 1938; M.S., from Northwestern University Dental School, 1940; Professor of Oral Pediatrics and in charge of Post Graduate Education for Children's Dentistry at Tufts College Dental School. Councilor of the Boston Section for International Association for Dental Research. In charge of various major research projects in the field of material and drugs used in dentistry. Special Consultant to the U. S. Public Health Department.

Essayist: Samuel Seltzer, D.D.S., Philadelphia, Pa.
Biography: Graduate of University of Pennsylvania Dental School, 1937; entered U. S. Army April 1941, relieved from active duty February, 1946, as Lieut. Colonel; returned to staff of University of Pennsylvania Dental School in 1948 in the Department of Operative Dentistry; engaged in several research projects in the field of endodontics and published many papers on the subject of endodontics and drugs used in dentistry for children.
Subject: The Development of an Antibiotic Formula for Root Canal Therapy.

THE AMBASSADOR HOTEL

Sunday, October 29, 1950 — 10:00 A.M. to 12:30 P.M.

TABLE CLINICS

1. Allen F. Weidman, D.D.S., Philadelphia, Pa., Associate Professor, Department of Oral Pathology, University of Pennsylvania.
   Subject: Histopathology in Children.
2. M. Michael Cohen, D.M.D., Boston, Mass. Lecturer in Stomatology at Tufts College Medical School. Instructor in Pediatrics, Tufts Medical School.
   Subject: Oral Pathology in Children.
3. Anna Mintz, D.M.D., Boston, Mass.
   Subject: Clinical Cases of Interest (Unsolved Problems).

4. Neal W. Chilton, D.D.S.; M.P.H., Trenton, N. J.
   Biography: Lecturer in Clinical Therapeutic and Pedodontics, New York University, College of Dentistry; Lecturer and Research Fellow in Dentistry, School of Dental and Oral Surgery, Columbia University Faculty of Medicine; Guest Lecturer in Oral Medicine and postgraduate Pedodontics, Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania; Guest Lecturer in Periodontia, Temple University School of Dentistry.
   Subject: Periodontal Disease in Children.
5. William J. Updegrave, D.D.S., F.A.C.D.
   Biography: Professor of Radiodontics—Temple University School of Dentistry; Past President, Pennsylvania Society of Dentistry for Children.
   Subject: Radiographic Technique for Children.
6. Martin F. Valentino, D.D.S., Brooklyn, N. Y.
   Biography: Assistant Professor at New York University, College of Dentistry (Dentistry for Children).
   Subject: Radiographs for Children and their Interpretation.
7. Dr. Mollie D. Foster, Pittsburgh, Pa., Associate Professor of Pedodontics, School of Dentistry, University of Pittsburgh, Pittsburgh, Pa.
   Subject: Factors which Influence Cavity Preparation in Primary Teeth.
8. Mark A. Wallach, B.S., D.D.S., New York, N. Y.
   Biography: Graduate of New York University, College of Dentistry, 1940; Staff of Guggenheim Clinic, 1940 to 1943. At present on staff of Department of Dentistry for Children at New York University College of Dentistry.
   Subject: Amalgam Restorations and Matrices for the Child.
9. Cannistraci, Andrew, D.D.S., New York, N. Y.
   Subject: Gold Restorations for Children.
10. Frank B. Gardner, D.D.S., Scanton, Pa.
    Biography: Graduate of University of Pennsylvania Dental School; President, Pennsylvania Society of Dentistry for Children, 1950-51.
    Subject: Direct Acrylics for Children.
11. Harold Berk, D.D.S., Boston, Mass.
    Biography: Graduate of Northwestern University, Dental School, 1941; Interne at Forsyth Dental Infirmary for Children, 1941-43; Instructor, Dentistry for Children, Tufts College Dental School; Consultant, Dentistry for Children, Beth Israel Hospital.
    Subject: Pulp Protection and Treatment of Fractured Anterior Teeth.
12. Harold R. Klein, D.D.S., New York, N. Y.
    Assistant Professor of Dentistry for Children, New York University, School of Dentistry, New York, N. Y.
    Subject: Pulp Treatment for Primary and Young Permanent Teeth.
13. I. B. Bender, D.D.S., Philadelphia, Pa.
    Instructor in Oral Medicine, University of Pennsylvania, Dental School.
    Subject: Antibiotic Treatment in Pulp Therapy for Children.
14. Frederick Sheire, A.B., D.D.S., M.S., Boston, Mass.
    Assistant Professor of Oral Pediatrics, Tufts College Dental School, Boston, Mass.
    Subject: Local Anesthesia in Dentistry for Children.
15. Neville A. Booth, D.M.D., Boston, Mass.
    Clinical Supervisor of Oral Surgery Department, Forsyth Dental Infirmary for Children.
    Subject: Minor Oral Surgery in Dentistry for Children.
16. Maxwell S. Fogel, D.D.S., Philadelphia, Pa.
    Biography: Staff Orthodontist, Community Health Center, Dental Dept., Philadelphia, Pa.
    Subject: Preventive Orthodontics.
17. Morris Kelner, D.D.S., Philadelphia.
    Biography: Graduate of Temple University School of Dentistry; Post-Graduate in Pedodontics, New York University, School of Dentistry, 1946-47; Pedodontist; Author of numerous papers on various phases of pedodontics.
18. Sidney Kronfeld, D.D.S., New York, N. Y.
    Biography: Graduate of New York University, College of Dentistry, 1935; Assistant Visiting Dental Surgeon at Gouverneur Hospital in New York City; Assistant Professor in Dentistry for Children at New York University College of Dentistry.
    Subject: Space Maintenance.
19. Raymond Werther, D.D.S., Philadelphia, Pa.
    Assistant Professor of Pedodontics, University of Pennsylvania, Dental School; Past President, Pennsylvania Society of Dentistry for Children.
    Subject: Space Maintenance.
20. Dental Guidance Council for Cerebral Palsy, Group Clinic, New York City.
    James Jay, D.D.S., Edward Heidt, D.D.S., Dr. Rizzolo, Dr. Stero.
    Subject: Dental Treatment of the Cerebral Palsied Child.
21. Herbert K. Cooper, D.D.S., Lancaster, Pa.
    Director, Lancaster Cleft Palate Clinic.
    Subject: Treatment of the Dentally Crippled Child (Cleft Palate). An Exhibit.

UNIT NEWS

Colorado

On February 28, 1950, the Colorado Unit of A.S.D.C. was initiated in the home of William P. Humphrey of Denver. Twenty-one dentists were present at the meeting. Election of officers produced the following results:

Paul Barker ..... *President*
Ben Kletzky ..... *President Elect*
Wm. P. Humphrey ..... *Vice President*
Henry Gage ..... *Secretary-Treasurer*

It was agreed that all members of A.S.D.C. in Colorado be notified of the organization and invited to join.

West Virginia

West Virginia now boasts of its forty members and is expecting to double that number during the May meeting.

Rhode Island

The unit of the small but dynamic state of Rhode Island held its annual meeting on February 21, 1950 and the result of their balloting is as follows:

Russell H. Carpenter ..... *President*
A. J. Kershaw ..... *Vice President*
Frank F. Bliss ..... *Secretary-Treasurer*

Michigan

The activity of the Professional Relationship Committee under the direction of the able Al Seyler has been very successful again this year. The committee made arrangements and produced quite a few interesting programs for the out-state dental societies. This committee is establishing a closer and more friendly relationship to those components not conveniently located to attend the meetings held in Detroit and neighboring cities.

New York

New filing equipment is needed by the N. Y. Unit because the membership has exceeded the thousand mark and still growing. The unit has its own publication, "The Bulletin of the New York State Society of Dentistry for Children." Recently Dr. Joseph H. Kauffman was given a rising vote of thanks from the members for his efforts as Chairman of the Publication Committee.

Alberta, Canada

Word has been received from the Sandy MacGregor Study Club of Edmonton. Although the group is small there has been plenty of activity and they are hoping to produce a moving picture film regarding general aspects of the children's clinic at the Faculty of Dentistry, University of Alberta.

Arkansas

The Arkansas Unit did much to aid the Central District Dental Society of Arkansas to advertise the National Children's Dental Health Day. Spot announcements over the Little Rock radio stations were "sparkplugged" by members of the A.S.D.C.

They have also gone on record with a letter to the Little Rock Water Board urging the fluoridization of the water supply on an experimental basis, according to A.D.A. specifications.

Minnesota

The motion picture, "It's Your Health," was shown on television for the National Children's Dental Health Day. Dental health was the topic for 15 minute programs produced by all the local radio stations.

Northern California

On Thursday evening, April 6th, Doctor Kenneth A. Easlick of Michigan, spoke to the members of the Northern California Unit. He spoke following a delicious roast beef dinner at the Athens Club in Oakland, California and with the aid of a projector and an extensive collection of informative slides, discussed injuries and treatments of young permanent teeth.

On Friday, April 28th, a special meeting of the Northern California Chapter of the American Society of Dentistry for Children, was held. Dr. Allen O. Gruebbel, who is the Executive Secretary of the Council on Dental Health of the American Dental Association, spoke on social and political conditions in New Zealand from whence he had just returned. He stated that he was going to submit a complete report pertaining to the dental practice conditions in New Zealand which was to be published at a later date.

Why Dentistry in Cerebral Palsy?*

MANUEL M. ALBUM, D.D.S.

Philadelphia, Pa.

Editor's Note:

Dr. Album is dental consultant for the Philadelphia Society for Crippled Children, which maintains the only clinic of its kind in the Country, for the care of cerebral palsy patients. This article should be of interest to the many men who encounter these children in their practice.

A. E. S.

In this 20th Century of scientific advancement and progress, we are seeing with our own eyes one of the most appalling situations that has ever existed; one that is so grotesque, so alarming, so pitiful that descriptive adjectives do not do the situation justice. I refer to the dental neglect of children afflicted with Cerebral Palsy.

Unfortunately, too few people outside of those associated with Cerebral Palsy are cognizant of the destruction that dental neglect and poor dental care is causing among these children, and what can be accomplished through proper and correct treatment. Here within our group is a basic cause for many of the psychosomatic conditions associated with Cerebral Palsy children, and which, unfortunately, we fail to recognize. These children should be accorded the same rights and privileges offered to normal boys and girls. Because they happen to fall into one of the many categories of Cerebral Palsy is no justification to deny or deprive them of treatment in any field, particularly that of dental care; and unless they are given the same opportunities, we are not being true to ourselves and to our conscience.

It is not my purpose to teach Dentistry at this time, but rather to show some of the precautions that should be taken in treating these young patients, some of the techniques that we emphasize, and to demonstrate how beautifully Dentistry can be applied to Cerebral Palsy children handled through our dental clinic at the Philadelphia Society for Crippled Children and Adults.

We must realize that in addition to being afflicted with Cerebral Palsy, these youngsters may be further handicapped by loss of speech, sight and hearing. Because of this, expert skill is necessary in assessing all the characteristic features of this child and in planning an effective program for treatment and education. Whether one is an orthopedist, neurologist, pediatrician, dentist, or what have you, all must work together as a team and as one unit, otherwise we can never obtain the best results. Included in this team should be the parent, who must be taught the correct manner of treatment and care and also their association with the child. Too often uninformed parents exert a negative influence on the child's progress and prognosis and only by proper parent training can this negative influence be lifted and the Cerebral Palsy child put on the proper and the right road of treatment.

Through no one's fault, very little—and that can be counted on the fingers of one's hand—has been written concerning the dental plight of children afflicted with Cerebral Palsy. Few men are qualified to diagnose and handle these children from the medical and orthopedic aspect; the dentists who are able to treat them are but a handful in number. This situation exists simply because dentists and physicians have not been properly trained to handle these children. It is true that the greatest strides in Cerebral Palsy have taken place during the past few years with the result that both the Medical and the Dental Schools have not had the opportunity to learn techniques and how to handle such children, but now, I hope that the situation can be rectified.

*Delivered before Cerebral Palsy Conference, Cook County Graduate School of Medicine, Chicago, Illinois, August 5, 1949.

One can understand the restlessness that some dentists might experience while a Cerebral Palsy patient is occupying their chair, and why they are hesitant about working on these children for fear of injury to the patient and to themselves, Actually, one cannot blame the dentist, for he should be acquainted with the background of these children, otherwise great harm can be inflicted quite innocently on them. We have been able to develop new techniques which have proved invaluable for us at our clinic. Our dental clinic to my knowledge is the only one of its kind in the country which is devoted primarily to treating Cerebral Palsy patients.

I have seen well over a thousand patients and handling a Cerebral Palsied child is quite different from the normal approach to patients. It is my contention that some of our Cerebral Palsied patients present a psychosomatic problem, directly or indirectly. These youngsters, when they first present themselves are extremely sensitive, frightened, and upset by the strange surroundings of the dental clinic or office. They should be put at ease before any work is even attempted. The slightest noise of the dental engine may cause them to go into a tremor, so it is important to adjust them to their environment. One of the most important and most difficult problems in handling a child of this type is the parent. There is no question concerning the immense role that these children play in the life of the parents, and unfortunately many parents have become so wrapped up with the child that indirectly he suffers as well as the rest of the family. This can be brought out very distinctly in the behavior of the Cerebral Palsied patient, and at times it is almost impossible to handle the child while the parent is in the room. There are some children who can be worked on without any parental interference, and then again, some cases where it is absolutely necessary to have one of the parents in the room. The action of the parent exerts a tremendous force on the delicate nervous systems of these children. Each case is an entity in itself and should be judged accordingly, but in any circumstances the parent factor is something that must be considered before any dental work can be attempted.

Athetoid patients must be handled differently from spastics because of their inability to govern the movements of their mouth for any long period of time. Consequently their jaws snap shut like that of a vise. Since these Athetoids exert such great force in their facial muscles, they present an abnormal condition of grinding the teeth, or bruxism, as it is sometimes called. They begin this grinding at an early age and perform it periodically during their lifetime. This bruxism, which also occurs in normal individuals, according to many scientists, is a sign of a psychosomatic disturbance. If this be the case, as has been proven in normal individuals, we are confronted with Cerebral Palsy children who produce this bruxism as a reflex action resulting from other disturbances to one or all of their systems. In the majority of youngsters who develop bruxism during their primary dentition, we also have a poor nutritional factor taking place. The teeth are poorly calcified and as a result of the bruxism they crumble, and form huge chasms or cavities. Many of these patients when seen during the early stages of speech training have little control of their tongue muscles and the muscles forming the floor of the mouth. As a result, in order to handle the child properly, there must be a thorough knowledge of the anatomy of the teeth and the surrounding tissues in order to prevent injury through improper treatment. Another factor in the treatment and care of these children is that some are born deaf. Fortunately, these are few in number, but they do exist and are extremely difficult to manage unless general anesthesia is administered.

All of us realize the important position that the dentist plays in the health of a child, because so many of the systemic diseases are first evidenced by lesions in the oral cavity. Therefore, when patients are admitted to the dental clinic for treatment, it is possible for us to observe in their mouths many symptoms of some systemic disease and see that they get into proper and capable hands for treatment. A great many of these patients might not have visited their physician until the disease had

progressed into the late stages when little could be done for them. Thus the dentist can recognize the disturbance and direct the patient into suitable hands. This again is evidence of teamwork and close cooperation. It is an excellent idea to have a complete case history available before any operative work is attempted on these children. Much can be learned from the medical aspect to guide one in their treatment. When the dentist is in doubt concerning particular phases of the patient's health, laboratory tests and roentgenograms should be performed. All physical findings inside and outside of the oral cavity should be carefully recorded. In this way you are safeguarding the youngster. One of the most important procedures in preventive dentistry for Cerebral Palsy children is the filling of the primary and permanent dentitions. I have seen too many cases in our clinic where no attention or care had been doled out to the primary teeth simply because individuals felt that it was not necessary to do so since these teeth would eventually fall out and be replaced by the permanent and more lasting set of teeth. Because the child has Cerebral Palsy is no reason to deprive him of the care of his primary teeth, and surprisingly enough, these teeth make all the difference in the world to Cerebral Palsy children. Not only are the primary and permanent dentitions necessary for speech, but badly broken down infected primary teeth greatly influence the development of the dental arches, and the eruption of the permanent teeth. Caries or decay in the primary teeth differs little from the permanent set of teeth. It is an excellent procedure to observe carefully all deep pits and fissures in these teeth and to fill them with some filling material or treat them with Ammoniacal Silver Nitrate, depending upon the circumstances. It is essential that when sterilizing the actual cavity prior to filling that a drug be used which will not harm the tongue or tissues of the mouth since some of these patients have little control over the musculature of the oral cavity.

A very important step in preventive dentistry for these children is the topical application of Sodium Fluoride to the teeth. The Public Health Service has done a remarkable amount of research on the subject and their results showed conclusively that treatment with Sodium Fluoride will produce an average 40 per cent reduction in the incidence of dental caries or decay. Sodium Fluoride will reduce the incidence of decay among these children while they are in their tender years, and for Cerebral Palsy youngsters these years are tender in every sense of the word.

Some children may require general anesthesia in order to perform ordinary dental work, and, in these cases, precautionary measures and proper care should be utilized. It is not advisable to work on these children under anesthesia for more than 30 minutes. It is also important to realize that many of them do not have the ability to inform the dentist of the proximity of the dental bur to the nerve of the tooth, making it possible for injury to occur to the nerve by the heat produced from the dental bur. This is especially true when working under local anesthesia or general anesthesia.

If extraction or oral surgery is contemplated on Cerebral Palsy children, it would be wise for the dentist to fortify himself with certain laboratory tests, particularly coagulation and bleeding time tests, so that he might obtain a better idea of the physical makeup of the patient. The appearance of the patient should be considered, and there should be a good case history at your disposal. Too often patients will not volunteer any information to the dentist and are somewhat reluctant about giving information even when asked. Such situations can best be averted by studying the complete case history of the patient. Drugs like Synkayvite and Thyloquinone should be used pre-operatively and post-operatively to bring about normal coagulation time and to retain it at a normal level. In addition, drugs like Oxy-cel and Gel-foam should be used routinely and without hesitation in order to aid in the formation of a proper blood clot in the socket following the extraction of teeth. I feel that it is an unwise procedure to extract more than two teeth at one sitting on these children unless they are hospitalized for a period of time and watched fastidiously during their stay in the hospital. The dentist should not only have the latest

drugs and medications at his disposal for any emergency that might arise, but must not dismiss the patient until he is certain that the blood clot has formed properly. Co-medication on these children is very important as it will relieve apprehension of the surgical ordeal and permit the operator to work more efficiently. Side reactions are few and brief in duration. They do not, as a rule, inconvenience the patient.

All these things appear to be a great deal of extra effort, but we are dealing with human lives, and we cannot afford to make mistakes. A little additional work prior to the operation pays off immeasurably afterwards.

The end result obtained by the treatment of Cerebral Palsy children in a correct manner is most gratifying. The important thing to remember is that no matter what phase of dentistry is carried out, the parents and everyone concerned must be educated on the evils that will prevail through dental neglect, and that the task is so much easier when there is teamwork and cooperation between the parents of the child and the various professions interested in Cerebral Palsy.

The Use of Anterior Steel Crowns as a Matrix for Plastic Fillings and Crowns

WILLIAM P. HUMPHREY, D.D.S.

Denver, Colorado

The use of chrome steel crowns as a matrix will facilitate the replacement of badly broken down anterior primary teeth, using acrylic filling material. (See Fig. 1.)

In the past when interproximal decay was deep, the generally accepted way of saving these teeth was to disc off the interproximals with a Joe Dandy disc or a diamond disc and precipitate silver nitrate. The following technique for placing these crowns not only restores the teeth but does it esthetically:

1. Clean out all caries (Usually mesial and distal—many times extending onto the labial surface).
2. Place a quick setting sedative cement in preparation to protect the pulp from the plastic monomer.
3. By using a Joe Dandy disc "honeycomb" the labial and lingual surfaces (Fig. 2).
4. Select the chrome steel crown you wish to use—stretch with anterior stretching pliers, if needed. (Fig. 3.)
5. Then cut the crown on the lingual using scissors—from the gingival to incisal. (If you have a spot welder, spotweld one spot at the gingival.) (Fig. 4.)
6. Festoon and adapt steel crown to gingival—extend the crown about 1 mm. below the free gingival, using No. 137 and No. 114 pliers. (Fig. 5.)
7. Dry and isolate tooth, fill crown form with plastic material, holding crown with thumb over the lingual cut (where you have split the crown, using scissors, from gingival to incisal). Place on tooth and hold for three minutes.
8. Before the plastic sets hard, take a sharp scaler or gold knife and trim the gingival excess. (Fig. 6.)
9. *Let patient read a comic for 30 minutes.*
10. Take a sharp scaler and open the lingual split wide enough to remove the steel crown from the tooth. (Fig. 7.)
11. Carve anatomy, using stones and rubber discs, then polish.

Fig. 1

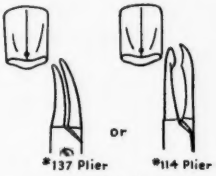

Fig. 5

Fig. 2

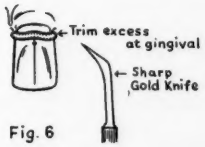

Fig. 6

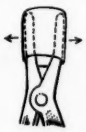

Fig. 3

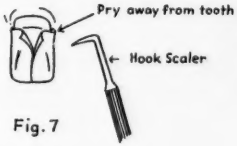

Fig. 7

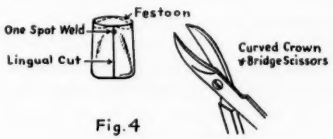

Fig. 4

The strength of the steel makes it possible to obtain a good gingival margin, and the rigid form has possibilities of producing a better condensed crown.

Materials needed: Anterior steel crown forms; anterior stretching plier; No. 114 and No. 137 plier; crown and bridge scissors; plastic filling material.

Prevalence of Caries in Chicago Suburban School Children (7 to 14 Years of Age)

MAURY MASSLER, D.D.S., M.S.
and
KISHORE CHAND, B.D.S. (Pb.), D.D.S., M.S.
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Chicago 12, Illinois

Editor's Note:

While the following article may be too statistical to appeal to most of our readers, it does offer valuable information which should be helpful to all of us in our evaluation of other published material and reports. It is long and must be published in two issues. Doctor Chand was a student of Illinois' Graduate Division who is now in Bombay, India, as Professor of Dentistry, working with Doctor Schourie.

A.E.S.

(Continued from last issue)

Materials

This study is based upon the oral examination of two groups of white American elementary school children, ranging in age from 7 to 14 years and totaling 686 in number (Table 1).

Melrose Park Group. The first group of 301 children was examined in the Lutheran Elementary School in Melrose Park—a small suburb west of Chicago. Melrose Park represents an average suburban community which contains several small manufacturing and industrial units and includes the usual retail and wholesale commercial establishments. In general, this group is representative of the broad middle range of socio-economic status in the Mid-West area of the United States.

Mooseheart Group. The second group of 385 children were residents of Mooseheart, a home for orphaned children, located in Mooseheart, Illinois. The children had been in residence at this institution for an average of three to four years. The Mooseheart children are admitted to the orphanage and subjected to an extensive program of "preventive medicine," including a selective diet, regular sleep, regular recreation and dental care.

Diet. A study of the diet of the Mooseheart children by Johnston in 1943 showed that the diet of every child was excellent and that there were more children (4 out of 21) in excellent nutritive condition, than are found in the usual public school. On these bases, this group can well be considered to approach a physically and dentally ideal group of children.

The children of Melrose Park were fed an average American dietary which, while superior to many areas of this and other countries, did not represent optimal intake of all nutritional elements.

The water supply in both areas contained no appreciable amounts of fluorides.

Dental Care. The children of Melrose Park, in addition to the usual dental care by private practitioners, were regularly seen by a conscientious but part-time school dentist who did his best to provide good dental care. The school boasted, each year, of a graduating class with no active caries. From the data which will be presented, it will be seen that this group did not receive *optimal* dental care. However, the group was far above the average American group of children in this respect. In contrast, the children of Mooseheart, in addition to a private 60-bed hospital, had available a beautiful, two-chair, private dental clinic with two full-time and one part-time dentist. The level of dental care for these

Table 1—Distribution of 686 Children Examined in Melrose Park and in Mooseheart According to Age and Sex.

	MELROSE PARK			MOOSEHEART		
Age in Years	*Boys*	*Girls*	*Both Sexes*	*Boys*	*Girls*	*Both Sexes*
7	23	14	37	18	16	34
8	21	23	44	29	28	57
9	17	30	47	21	21	42
10	12	8	20	31	19	50
11	11	21	32	38	16	54
12	34	24	58	29	14	43
13	29	22	51	33	24	57
14	9	3	12	25	23	48
7 to 14	156	145	301	224	161	385

children probably represents the best to be found in the United States. (Child:Dentist ratio about 300:1). Children requiring orthodontic correction receive care in the dental clinic under the supervision of an expert consulting orthodontist.

Table 1 and Figure 1 indicate the distribution of the two groups of children examined according to schools and sex. These illustrations indicate a fairly even distribution of children between both schools and both sexes. The number of 10, 11 and 14 year old children was rather lower than desirable (Table 1). All of the children at both schools were examined in order to eliminate any factor in selection.

Methods

Examination. The dental examinations were made with No. 3 plain mirrors and fine, pointed, pig-tail explorer under good natural or artificial lighting conditions (spotlight).

Teeth designated as carious were those which showed actual, although frequently small, cavities. The lesions recorded were therefore those which were readily found on careful, clinical dental examinations. Pits and fissures, which after thorough inspection and exploration were not considered *definitely* carious, were not counted as caries.

Degree of Caries. The teeth and tooth surfaces affected were recorded in a manner essentially similar to that suggested by Klein and Palmer (1938). To denote the degree of severity, the extent and depth of each carious lesion on each of the five tooth surfaces was recorded as follows:

First degree: If the explorer caught in a small external opening in the enamel or if it sank beneath the surface of the enamel, but did not enter the dentine, the cavity was classified as degree 1.

Second degree: If the explorer entered the soft dentine, or if the dentine was exposed to about half its width or depth, the cavity was classified as degree 2.

Third degree: If the tooth was badly broken down, the cavity was classed as degree 3.

If the pulp was exposed it was marked (X) indicating extraction, and was counted as 4 surfaces x 3 severity equals 12.

Extracted teeth were counted as having had *four* carious surfaces since Wessel and Cheyne have shown that 5 surfaces counted for missing (M) teeth is too high a figure. Crowned teeth were also given a value of four decayed surfaces.

Active decay was recorded in red, fillings in blue.

If a tooth had been restored by the dentist, its size and extent was marked in *blue pencil* according to the same criteria as above for carious lesions.

The children in Melrose Park were examined in three days. Only first molars were recorded. No radiograms were taken and each child was completed within 1¼ minutes.

The children of Mooseheart were examined at two different times. The first examination was identical to that used in Melrose Park and was made by the same examiner. The second examination was performed by the Mooseheart dentists who charted the *entire* mouth after taking and examining full mouth radiograms. The latter examination required from 20 to 40 minutes per child. The data obtained at the second examination were used (a) to check the accuracy of the "short" method of examining first permanent molars, and (b) to test the validity of using the first permanent molars as an index to the caries experience of all the permanent teeth.

FINDINGS

Caries Experience

Number of Children Affected by Caries. Table 2 and Figure 2 show the per cent of children with first permanent molars affected by caries at each age level. By the age of 7 years, more than half (52.0 percent) of all the children had one or more carious first permanent molars. This molar attack rate accelerated very rapidly so that by 10 years of age, 92.7 percent of all the children had one or more carious first permanent molars. After the age of 10 years, the rate remained almost constant—approximately 90 percent to 91 percent—until finally 93.3 percent of all children were affected by 14 years. Thus two phases in the rate of caries attack (number of children with first permanent molars affected by caries) could be recognized; an initial rapid increase from 7 to 10 years and an almost constant level from 10 to 14 years (Figure 2).

Average Number of Carious (DMF) First Permanent Molars per Child. Table 2 and Figure 2 show that the average number of carious (DMF) first permanent molars per child increased from ages 7 to 14 years in a manner almost parallel to the increase in the number of children affected. Knutson (1944) has already indicated that parallelism exists between the percent of children affected by caries and the average number of carious (DMF) teeth.

The number of carious first molars increased from 1.35 at 7 years to 3.3 out of 4 molars at the age of 10 years. The increase thereafter was slower, until at 14 years, 3.72 out of 4 first molars are carious. The slower increase from 10 to 14 years may be explained by the fact that only 0.7 molars were available for carious attack after the age of 10 years.

Average Number of Carious (DMF) First Permanent Molar Surfaces per Child. Table 2 and Figure 2 show that the number of carious (DMF) tooth surfaces was already quite high (1.59) at the age of 7 years, less than one year after the first permanent molars had erupted. This is to say that by 7 years of age, the average child had 1.35 carious molars (out of a possible four first molars) and that 1.59 surfaces (out of a possible sixteen molar surfaces) were carious.

The rate of increase in carious surfaces of first permanent molars was rapid but *continuous* from 7 to 14 years rather than biphasic. The two phases seen in the curves indicating percentage of children affected with carious first permanent molars and the number of carious first permanent molars per child and the plateau from 10 to 14 years were absent in this curve. The rate of increase was almost as rapid from 10 to 14 years as it was from 7 to 10 years, except for artificial depressions at 11 and 12 years. This uniphasic character may be due simply to the larger number of first permanent molar surfaces available to attack by caries, i.e., each tooth has 5 anatomic and 4 vulnerable surfaces so that each tooth may be attacked 4 times (once on each vulnerable surface) in the interval from 7 to 14 years, whereas each first permanent molar or each child once attacked could not be counted as attacked by caries again.

Table 2—Incidence of Carious First Permanent Molars in 686 Children 7 to 14 Years of Age.

Age in Years	Number of Children Examined	Percent of Children with Carious First Permanent Molars	Average No. DMF First Permanent Molars per Child	Average No. DMF First Molar Surfaces per Child	Average No. DMF Surfaces per DMF First Permanent Molars	Average Degree of Caries per Carious Surface	Hagerstown Children: Average No. DMF First Permanent Molars per Child
7	71	52.00%	1.35	1.59	1.18	1.13	0.72
8	87	75.98	2.37	2.98	1.26	1.47	1.16
9	89	79.98	2.80	3.54	1.27	1.37	1.74
10	70	92.70	3.30	5.10	1.54	1.48	2.11
11	86	90.70	3.08	4.50	1.46	1.12	2.14
12	115	90.40	3.13	4.85	1.55	1.46	2.39
13	108	90.70	3.26	6.26	1.92	1.80	2.71
14	60	93.30	3.72	6.07	1.63	1.79	2.91
7 to 14	686						

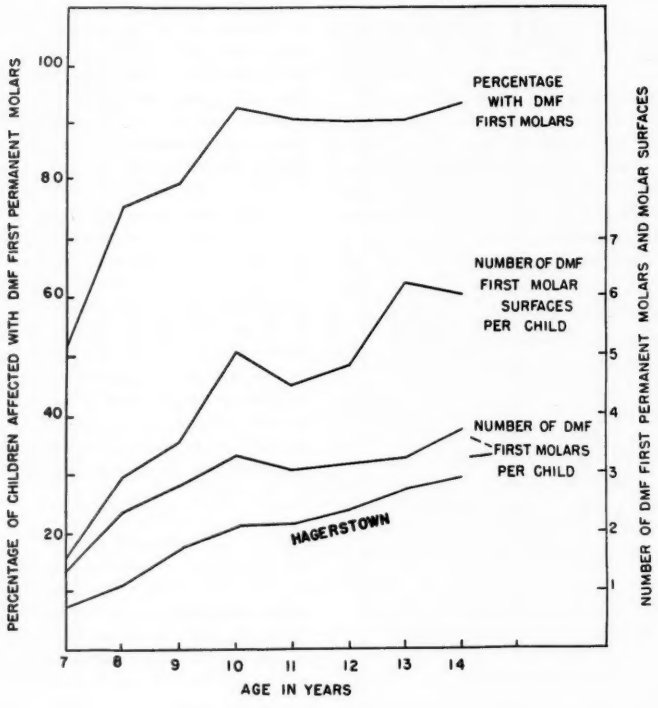

Fig. 2—Graph Showing Incidence of Carious First Permanent Molars in 686 Children 7 to 14 Years of Age.

Ratio of Carious Tooth Surfaces to Carious Teeth (Table 2). At age 7 there were 1.59 carious surfaces on 1.35 carious teeth—or a ratio of 1.18 carious surfaces per carious tooth. This ratio increased more or less smoothly until at the age of 14 years, 6.1 surfaces were carious on 3.7 carious first molars or a ratio of 1.63 carious surfaces per carious first molar.

Comparison of Melrose Park and Mooseheart. The data obtained from each school were analyzed separately and compared. It was found that there were no significant differences in the findings between the two groups. Therefore all data were thereafter combined.

Comparison with Hagerstown Study. Table 2 (compare columns 4 and 8) and Figure 2 show that ours was a relatively *high caries group if compared to Hagerstown.* By the age of 7 years, Chicago Suburban children had 1.35 molars affected by caries, compared to 0.72 in Hagerstown (ratio of 1 to 1.9). By 14 years of age, the Chicago suburban children had 3.72 molars affected by caries while the Hagerstown children had 2.91 molars affected (ratio of 1 to 1.7).

Degree of Caries

One of the purposes of this study was to apply the various methods of assessing caries experience to a group of grade school children in an effort to determine the relative accuracy and usefulness of such methods. The three most commonly employed methods of assessing caries experience (percentage of children affected, number of teeth affected and number of tooth surfaces affected) have been used throughout this study.

An attempt was made to utilize a fourth method which would be an even more accurate definition of caries experience, namely, the degree of caries on each surface affected as described under the section on methods.

The results obtained are presented in Table 2, column 7, where these results are also compared with the data obtained by the other three methods of assessment.

Table 2, column 7, indicates that the average degree of caries ranged from 1.12 to 1.80 per carious surface. Since a value of 1.0 indicates a small lesion just through the enamel and 2.0 indicates a carious lesion exposing the dentine to about half its depth and half the width of the surface attacked, 1.12 would indicate a minimal dentine lesion while 1.80 indicates a dentine lesion affecting somewhat less than half the depth and the surface attacked.

From Table 2, column 7, it can be seen that the size of the lesion tended to increase with age (except at age 11 years, which is probably an artifact).

The usefulness of assessing the degree of caries in conjunction with the other three methods of assessment can be illustrated from the following example taken from Table 2. At the age of 10 years, 92.7 percent of the children have one or more carious first permanent molars. The average child (male or female) has 3.30 carious (DMF) first permanent molars and 5.10 molars surfaces attacked by caries—or an average of 1.54 carious surfaces per carious first permanent molar. In addition, each carious surface would be 1.48 in size and extent, or approximately one quarter of the depth of the dentine and extent of the surface affected.

These analyses show that no one method of assessment is necessarily superior or more desirable than the other, since each indicates a definite area of expression of the caries experience. The use of all four methods of assessment is much superior to the use of any one singly. The total gives a much more accurate and complete definition of the caries experience in the average child than does any single method.

Comparison of Caries Experience in Boys and Girls

Number of Children Affected by Caries. Table 3 and Figure 3 show that in general more girls were attacked by molar caries than were boys at all ages except 11 years. The difference, while small, was statistically significant.

Number of Carious First Permanent Molars. Table 3 and Figure 3 show that the girls had a greater number of carious first permanent molars than did the boys at every age period except 10 and 11 years. The difference for the total group (0.5 percent) was statistically significant ($P = .02$).

Table 3—Comparison of Caries Experience in First Permanent Molars Between 380 Boys and 306 Girls, Ages 7 to 14.

Age in Years	Number of Children Examined		Percent of Children with Carious First Permanent Molars		Average No. DMF First Permanent Molars per Child		Average No. DMF First Molar Surfaces per Child	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
7	41	30	48.80%	60.00%	1.24	1.50	1.54	1.67
8	50	37	64.00	92.00	2.10	2.64	2.52	3.30
9	38	51	76.40	82.30	2.66	2.90	3.16	3.81
10	43	27	93.00	92.58	3.50	3.00	5.30	4.75
11	49	37	93.87	86.95	3.19	2.92	4.41	4.60
12	63	52	88.90	92.93	3.06	3.22	4.40	5.40
13	62	46	83.88	100.00	2.92	3.72	5.92	6.72
14	34	26	94.10	92.93	3.15	3.30	5.45	6.90
Total	380	306						

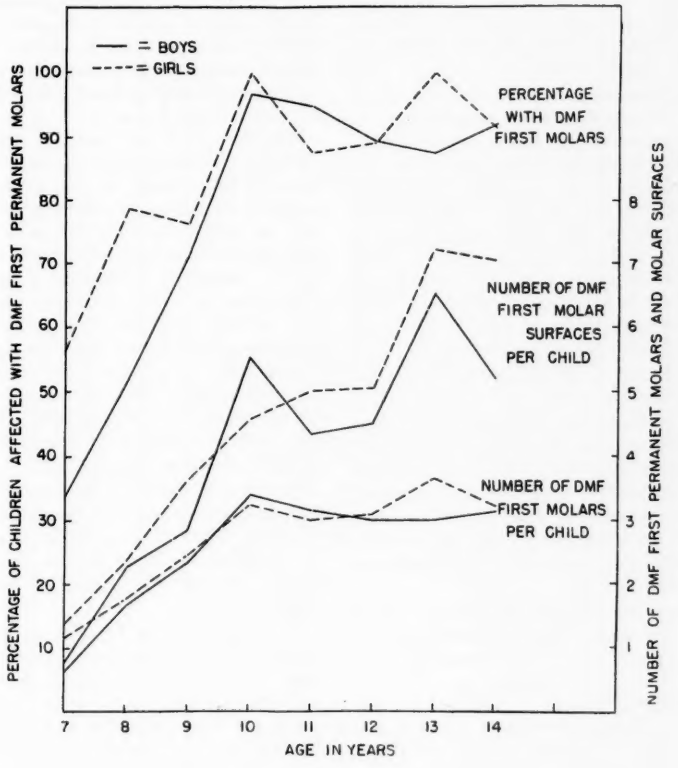

Fig. 3—Graph Comparing Caries Experience in First Permanent Molars Between 380 Boys and 306 Girls, Age 7 to 14 Years.

Number of Carious First Permanent Molar Surfaces. Table 3 and Figure 3 indicate that girls also had a greater number of carious molar surfaces affected than did boys at every age except 10 years. The difference (approximately 0.5 percent) was statistically significant ($P = .02$).

Distribution of Children with 1, 2, 3 or 4 Carious First Permanent Molars

It became evident, during the course of the study that the individual child varied considerably in caries susceptibility and could be classified as low, medium or high in caries susceptibility depending upon whether he had 1, 2, 3 or 4 first permanent molars attacked by caries. It was felt, therefore, that it would be important to determine not only the average caries experience for the entire group, but also to determine how many children had 1, 2, 3 or 4 first molars attacked by caries.

Table 4 and Figure 4 show that the number of children with zero or with 4 carious first molars outnumbered the children with 1, 2 or 3 carious molars. In other words, if the molars in any given child were attacked by caries, there was a stronger tendency for all 4 to be attacked than for either 1, 2 or 3 molars to be attacked.

Comparison of Caries Experience in First Permanent Molars with Caries Experience in All Permanent Teeth

One of the objectives of this study was to *actually* analyze the validity of using the first permanent molars as an index of the total caries experience in all permanent teeth. While such use had often been suggested on logical grounds (see Review of Literature), to our knowledge the validity of such had not been established on statistical grounds.

For this purpose all the teeth, including the first permanent molars, of the 381 children of Mooseheart were examined with great care (including full mouth roentgenograms) and the findings subjected to analysis. The caries experience (number of carious teeth and tooth surfaces) of all permanent teeth were thus compared with the caries experience in first permanent molars alone.

Table 5 and Figure 5 show quite clearly that the first permanent molar is a perfect indicator of caries experience for all permanent teeth for the ages 7 to 9 years. This must be true because the first permanent molars constitute, practically, the entire *susceptible* permanent tooth population. The incisors are not newly erupted—but these teeth are very much less susceptible to decay and seldom attacked so early.

From the ages 9 to 12 years, the incisors and bicuspids entered into the caries picture more and more strongly so that the curves indicating the number of carious permanent teeth and tooth surfaces and the curves indicating the number of carious first molars alone began to diverge—not markedly, but significantly. However, it is quite apparent that the *trends* of both curves were very similar, i.e., both show an increase with age, but at slightly different rates. Therefore, it is valid to assume that examination of first molars alone during this age period (9 to 12 years) will indicate fairly well the *trend* in caries experience for the entire permanent dentition.

Further examination of the data reveals the fact that the curves comparing the number of carious (DMF) tooth surfaces are much *less divergent* and more parallel than the curves comparing the number of carious (DMF) teeth.

From the ages 12 to 14 years, the curves comparing carious permanent teeth with carious first molars continue to diverge more and more, especially the curves showing the number of DMF teeth. This is due to the fact that the curve showing the number of carious first molars flattens perceptibly while the curve showing the number of DMF permanent teeth continues to rise even more rapidly than before. This last is due, no doubt, to the entrance of the highly susceptible second molars and bicuspids into the caries picture.

The curves indicating the number of carious tooth *surfaces*, on the other hand, while they continue to diverge from 12 to 14 years, do so only slightly more than before. The curve for all carious permanent tooth surfaces shows a marked acceleration again probably due to the entrance of the second molar into the caries picture. But the curve for carious

Table 4—Distribution of Caries Experience (Number of First Permanent Molars Affected Per Child) Among 686 Children of Melrose Park and of Mooseheart.

Age in Years	Number of Children Examined	Percentage of Children with Carious First Permanent Molars				
		No Molars Affected	One Molar Affected	Two Molars Affected	Three Molars Affected	Four Molars Affected
7	71	48.0%	9.8%	19.7%	5.6%	16.9%
8	87	25.2	9.2	12.6	13.8	39.2
9	89	20.0	5.5	9.0	11.5	54.0
10	70	4.3	2.9	5.8	11.6	68.4
11	86	9.3	2.3	16.3	16.3	55.8
12	115	9.8	2.7	13.0	12.5	62.0
13	108	10.2	2.8	6.5	12.0	68.5
14	60	8.3	5.0	10.0	10.0	66.7
Total	686					

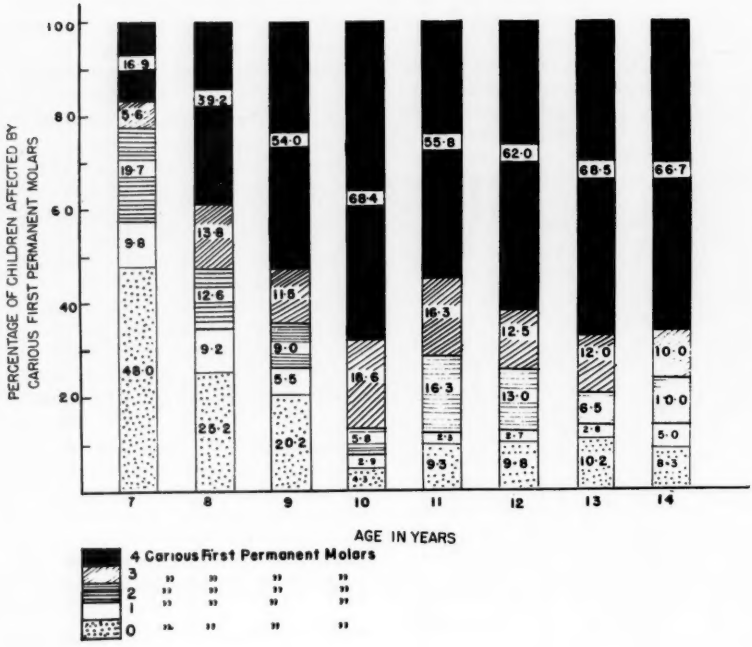

Fig. 4—Graph Showing Distribution of Caries Experience (Number of First Permanent Molars Affected per Child) Among 686 Children.

Table 5—Comparison of Carious Experience in First Permanent Molars with All Permanent Teeth in 381 Mooseheart Boys and Girls.

Age in Years	Number of Children Examined	No. DMF Permanent Teeth	No. DMF First Permanent Molars	Ratio of No. DMF First Molars to No. DMF Permanent Teeth	Average No. DMF Permanent Tooth Surfaces	Average No. DMF First Molar Surfaces	Ratio DMF First Molar Surfaces DMF Permanent Tooth Surfaces
7	27	1.15	1.11	97.0*	1.41	1.26	89.5
8	42	1.55	1.50	96.6	1.93	1.88	97.5
9	41	2.34	2.17	92.7	3.07	2.95	96.0
10	53	2.96	2.38	80.4	4.00	3.28	82.0
11	50	3.26	2.54	78.0	4.47	3.60	80.5
12	57	4.23	2.93	69.4	7.20	5.50	76.5
13	48	5.05	2.80	55.5	7.80	5.12	65.5
14	63	6.60	3.13	47.3	11.45	6.76	59.0
Total	381	3.70	2.45	66.1	5.73	4.12	71.9

*One child had two carious incisors, but no carious first molars.

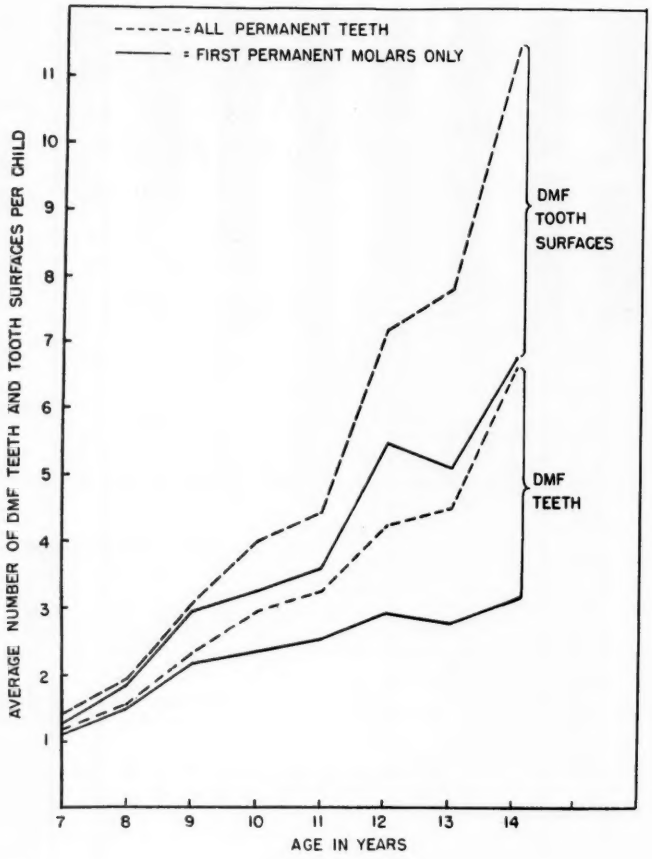

Fig. 5—Graph Comparing Caries Experience in First Permanent Molars with all Permanent Teeth in 381 Mooseheart Children. These graphs were similar when girls and boys were analyzed separately.

first molar tooth surfaces *also continues to increase and does not flatten out.* This is due to the fact that by age of 12 years, all the first molars which are destined to be attacked by caries are already carious; but not all their *surfaces* are carious, some being still available to attack even at 12 to 14 years of age.

We can conclude, therefore, that if tooth surfaces are counted rather than teeth alone, then it is still valid to use the first permanent molars as an index of the caries experience for the entire permanent dentition—even to the age of 14 years.

Comparison of Data on Caries Experience (DMF First Molars and Molar Surfaces) Obtained by Two Separate Examinations of the Children in Mooseheart

In order to test the reproducibility and reliability of the figures obtained by the DMF first molars type of survey, the entire group of children residing at Mooseheart were examined by two different observers approximately one year apart as previously indicated. While some minor differences may have occurred in the caries experience during that time, the stability of the population should have rendered such differences negligible.

Percentage of Children Affected by DMF First Molars. Table 6 and Figure 6 compare the results of both examinations. It will be seen that differences ranging from 0.28 to 12.6 percent occurred between the figures obtained by the first and second examination with an average difference in the figures obtained of 6.5 percent (Table 6). This indicates that a range of approximately ± 3.3 percent should be expected in any results obtained by this method.

Number of DMF First Molars per Child. Table 6 and Figure 6 also indicate the number of DMF first molars obtained by the two examinations. The difference varied from 0.11 to 0.94 with an average difference of 0.435 DMF first molars per child. The expected range could, therefore, be estimated as ± 0.22 DMF first molars.

Number of DMF First Molar Surfaces per Child. The difference in the number of DMF molar surfaces obtained by the two examiners ranged from 0.23 to 1.90 DMF molar surfaces with an average difference of 0.87. The expected range is, therefore, only ±0.44 DMF molar surfaces per child (Table 6 and Figure 6).

The number of DMF first molars per child provided the more reproducable and, therefore, exact indicator of caries experience since the differences between the two examinations were much less in this category than in the other two. These findings were the same when boys and girls were analyzed separately.

These data substantiate the findings of Deatherage, Lawrence and Ledgerwood (1939) who observed that because of the special circumstances under which these observations are made, and the limited time available for such epidemiologic surveys, a routine variability is to be expected in diagnosis of dental caries in children of school age.

While some small change in the child population at Mooseheart did occur during the year intervening between the two examinations (and some increase in caries attack certainly did occur), we feel that the difference in the figures obtained by the two examinations were probably due to differences in the examiners and their examining technique. It is significant that the more careful and slower clinical type of examination made by a non-epidemiologist and which lasted for approximately twenty minutes per child yielded a *lower* caries attack rate than did the faster epidemiologic examination made by a trained observer. This phenomenon which relates the attitude of the examiner to what he actually sees, is not unique to caries research.

DISCUSSION

The high susceptibility of the first permanent molars to caries has been recognized since the early days of modern dentistry. In addition, they are the first of the permanent teeth to appear in the oral cavity. Since caries is a cumulative disease, the first permanent molars record most prominently the ravages of decay from their eruption at 6 years until they are lost by extraction. The first permanent molars have, therefore, most often been the object of studies in the epidemiology of caries.

Table 6—Comparison of Caries Experience (DMF First Molars and Molar Surfaces) in Mooseheart Children as Obtained by Two Separate Examiners.

Age in Years	Number of Children Examined		Percent of Children with Carious First Molars		Average No. DMF First Permanent Molars per Child		Average No. DMF First Molar Surfaces per Child		Ratio DMFTS DMFT	
	1st Exam.	2nd Exam.	1st Exam.	2nd Exam.	1st Exam.	2nd Exam.	1st Exam.	2nd Exam.	1st Exam.	2nd Exam.
7	34	27	44.12%	44.40%	1.10	0.88	1.26	1.03	1.14	1.17
8	43	42	60.47	54.76	1.44	1.72	1.88	2.30	1.30	1.34
9	42	41	73.80	80.50	2.16	2.38	2.96	3.24	1.37	1.36
10	50	53	98.00	86.88	2.38	3.32	3.28	5.18	1.38	1.56
11	54	50	92.60	80.00	2.54	3.09	3.58	4.52	1.41	1.46
12	57	57	89.48	84.00	2.93	3.60	5.49	4.77	1.87	1.94
13	57	48	92.75	87.50	2.80	3.29	5.12	6.85	1.83	2.08
14	48	63	91.50	87.30	3.07	3.18	6.77	6.10	2.20	1.92
Total	385	381								

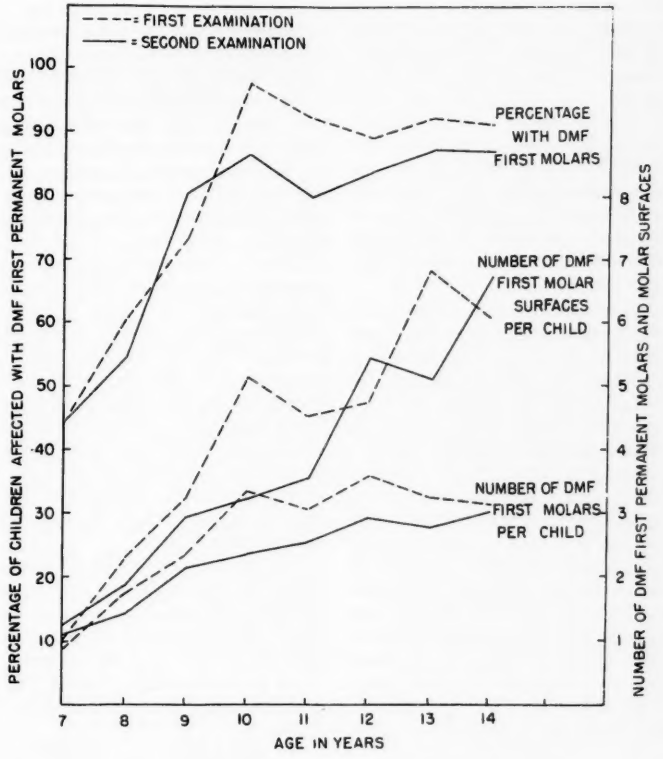

Fig. 6—Graph Comparing Caries Experience (DMF First Molars and Molar Surfaces) in Mooseheart Children as Obtained by Two Separate Examiners. These graphs were similar when girls and boys were analyzed separately.

Generalizations. In epidemiologic studies (and in clinical practice), counting the number of tooth surfaces attacked by caries is a much more accurate and valid method of recording caries experience than counting only the number of teeth affected. Teeth alone are not an adequate expression of caries experience since by the age of 10 years all four first molars which will be attacked are already attacked. However, only one or two of the four vulnerable surfaces have been attacked so that 2 or 3 more surfaces can be attacked further from 10 to 14 years of age. A combination of DMF teeth and DMF tooth surfaces is a better expression than either one alone.

A more refined method that includes severity or depth and extent of cavitation would better serve as a measure of caries experience than carious surfaces alone. Statistically (as well as clinically) greater weight should be given to a tooth or tooth surface with a deep lesion than to one with a superficial lesion.

The number of carious first permanent molar tooth surfaces is a valid index of the caries experience in all the permanent teeth up to the age of 12 years (during the mixed dentitional period). However, after that age it is better even in epidemiologic surveys to include the second molars (and possibly also the bicuspids) when these highly susceptible teeth enter into the caries picture. It should be remembered that the age of 12 years ushers in the era of teen-age caries and an acute exacerbation of the caries attack rate (Massler, 1944).

Variability in DMF Data. There is considerable evidence to indicate the fact that the DMF figure will vary considerably depending upon the experience and care exercised by the examiner (Deatherage, Lawrence and Legerwood, 1939). Such variations would, of course, indicate a range within which the DMF number should be expected to vary and would thus determine the significance of the difference between any two DMF figures.

To test the variability of the DMF number, the children were examined twice, a year apart, by two different examiners. It was found that one should expect a range of:

- ±3.0 percent in the percentage of children with carious first permanent molars;
- ±0.22 DMF first permanent molars per child, and
- ±0.44 DMF first molar tooth surfaces per child (Table 6 and Figure 6).

SUMMARY AND CONCLUSIONS

The purpose of this study was to survey the caries experience in two groups of grade school children living near Chicago, using the first permanent molars as a measure of caries experience. It was necessary to select an adequate indicator of caries experience for this group rather than to record the caries experience of all teeth present, since in the mixed dentitional period, the exfoliating primary teeth and the constant appearance of newly erupted permanent teeth make the assessment of the entire dentition difficult. The first permanent molars were selected for this purpose because they appear in the oral cavity at the beginning of the mixed dentitional period (approximate age, 6 years) and remain in function thereafter. In addition, other studies have clearly demonstrated that they suffer the highest caries attack rate of all the teeth in either dentition.

A secondary purpose was to establish the validity of the use of the first permanent molar for this purpose on a statistical rather than a logical basis alone, since, in epidemiologic surveys, the use of the first molar as an index to average caries experience in large groups is becoming more and more widespread.

A third purpose was to test various methods of expressing caries experience and thus discover the method most useful for epidemiological studies. It was demonstrated that each method of recording and analysis has some virtues and some drawbacks. The simpler methods have the virtue of simplicity and speed, but are more variable; the more complex methods are more stable and accurate but are time consuming. Therefore, the method of choice should be determined by the size of the sample to be investigated as well as by the accuracy of results desired.

The choice of two groups of school children was only incidental to this study and was made only for larger sampling. In both

schools, 100 percent of the population was examined.

CONCLUSIONS

1. The caries experience in both schools (Mooseheart and Melrose Park) was rather high when compared with Hagerstown children (Table 2 and Figure 2).

2. There was a tendency for girls to show a slightly higher caries experience than boys (except at ages 10 and 11 years).

3. The data indicate clearly that recording the number of carious tooth surfaces is a much more satisfactory and significant measure of caries experience than the number of carious teeth alone.

4. Assessment of the average degree of caries per carious surface (Table 2, column 7) is a valuable addition to the methodology of epidemiologic surveys.

5. The data obtained from examination of the entire mouth indicated that the first permanent molar is a good index of caries experience up to the age of 12 (during the mixed dentitional period) but is probably not as satisfactory an indicator thereafter when the highly susceptible second molars enter into the caries picture. Inclusion of the second molars after the age of 12 years would probably eliminate any statistical objections.

6. A survey conducted a year apart by two different operators for assessing the DMF experience in the Mooseheart children revealed that a variability exists in the total analysis when examinations are made by different examiners (Table 6 and Figure 6). The training of the examiner is as important as the method of analysis in the accuracy of the final results.

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700—Set of upper and lower..... $ 5.00
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701—Set of upper and lower, used for constructing space retainers..... 5.00

NOTE: The above models are in one color, all-ivory, i.e. ivory teeth and ivory jaws.

Any of the above sets of models can be supplied articulated. For the articulated models add $2.50 to the prices listed.

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760—Set of upper and lower pink jaws, with 24 removable Ivorine teeth including six year molars, and spring-joint articulator..... $28.00
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Extra individual teeth, each..... .60

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R760—Set of upper and lower rubber jaws, with 24 removable Ivorine teeth..... $22.00
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280—3 diameters: Set of 20 deciduous teeth with natural-shaped roots..... $ 7.00 per set of 20 teeth
Individually..... .50 each for molars; .35 each for all others
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Extra individual teeth..... .35 each
F281—3 diameters: Upper and lower full-jaws with fixed teeth, including 6-year molars..... 7.50 per set
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AROUND THE COUNTRY

Ralph Mott Erwin, Jr., past president of the American Society of Dentistry for Children, announces the removal of offices from The Corbett Building to 911 Selling Building, Portland 5, Oregon. Dr. Erwin practices Pedodontics exclusively.

★ ★ ★

The Buffalo Dental Association of Erie County attempted their first Children's Dentistry Day and had a very successful event with approximately 200 present.

Alfred E. Seyler, Professor of Pedodontics at the University of Detroit, editor of this Journal, and past President of the American Society of Dentistry for Children, was the guest essayist and discussed "Operative Procedure for the Young Child Patient."

Eugene North, an A.S.D.C.'er, was moderator of a symposium which included Dr. Seyler; Sherman Little, M.D., a child Psychiatrist; and Mitchell Rubin, M.D., Professor of Pediatrics, University of Buffalo.

Table clinicians presented excellent instructive material on most of the procedures encountered in a children's practice. Clinicians included: Dr. John Christianen, C. Sugnet, J. Brandetsas, Henry Jann, Ray Kielich, and William Wallace. All doctors are members of the American Society of Dentistry for Children.

Congratulations to the Buffalo Dental Association of Erie County—may this event be an annual affair.

★ ★ ★

The Indianapolis Dental Society and the Indiana University School of Dentistry presented a full day Symposium on Dentistry for Children on April 5. Essayists for the program included Dr. Stewart A. MacGregor, Chairman of the Pedodontic Department of the University of Toronto; Alfred E. Seyler of Detroit, Michigan; Lyman T. Meiks, M.D., Pediatrician of the Indiana University School of Medicine; Dr. Grant Van Huysen, Histopathologist at Indiana University School of Dentistry; and Dr. Roy Smiley, Director of the Dental Division of the State Board of Health. Dr. MacGregor and Dr. Seyler also presented clinics as did the Department of Orthodontics of the University.

★ ★ ★

On March 20 more than 50 Nebraska dentists met at the University of Nebraska, College of Dentistry for the semi-annual meeting of the Nebraska Society of Dentistry for Children. A day long panel discussion, starting at 9:30 a.m. was devoted to the subject of "Practice Management as Applied to Dentistry for Children." Members of the panel were Dr. T. P. Mullins, Chadron; Dr. Eugene Walters, Columbus, Dr. Herbert Jackson, Beatrice; Dr. Laren Teutsch, Omaha; Dr. F. W. Albrecht, Lincoln, Moderator was Dr. Earl Lampshire, Lincoln.

At the evening banquet of the Society, held at the Student Union, Mrs. Ruth Pierce, Chief of the Division of Public Assistance for the State of Nebraska, spoke on "Dentistry and Aid to Dependent Children."

★ ★ ★

A.S.D.C.'er George Quigg presented a discussion on "Cavity Preparation and Restoration in Primary Teeth" at the University of California Alumni Meeting on January 23, 1950.

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Recent activities of Dr. Charles A. Sweet, Sr., include the following—a lecture on "Dentistry for Children" to residents and interns of Children's Hospital of the East Bay, February 16, 1950. "Pulpal Therapy," Santa Barbara-Ventura Counties Dental Society, February 17, 1950. "Problems in Patient Management" before the Washington Society of Dentistry for Children, at their Midwinter meeting, January 21, and 22, in Seattle. "Pulpal Therapy in Primary and Young Permanent Teeth" at the same meeting; also a discussion on "Consideration of Cavity Preparation."

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Jim Schofield, of our Michigan Unit, has completed requirements for his M.S. in Pedodontics at the University of Michigan and has announced the opening of offices at Jackson,

Michigan. Jim is another graduate of the University of Detroit, who decided to specialize in dentistry for children after his return from service. Good luck to you, Jim.

★ ★ ★

Ken Easlick spoke before the Northern California Unit on April 6. His usual factual presentation was enlivened by unusual good humor attributed to that wonderful California weather!

★ ★ ★

Dr. Allen Gruebbel, Executive Secretary of the Council on Dental Health of the A.D.A., spoke at a special meeting of the Northern California Unit Friday April 28. Dr. Gruebbel had just returned from New Zealand, where he had observed the dental nurse plan in operation, and his presentation had to do with his evaluation of the plan.

★ ★ ★

Cincinnati's Ninth Annual Children's Dental Health Day presented two A.S.D.C. members, E. Carl Miller and Al Seyler last March 20. Editor Al writes to me that he was much impressed by the luncheon attendance, which was well over 400. The beautiful ballroom of the Netherland Plaza was crowded with dignitaries of the city, school and lay officials, who heard Doctor Byron Hughes of Ann Arbor, speak on "Growth, Heredity and Child Psychology." Barney got his points across in his usual good style.

It is surprising to us that a city which was one of the early leaders in recognizing Children's Dental Health Day, does not have more active members in the Ohio Unit. How about working on that project, Doctor Durham?

★ ★ ★

The Graduate students in Pedodontics at the University of Michigan, Panzer, Leibold, Mickler, Coughlin and Taylor took a Saturday off this month to see the Detroit Tigers win a baseball game and to visit a few of the night spots around Detroit.

★ ★ ★

Jack Gilster, of Chester, Illinois, is going to work for Dr. Ruth Martin at Washington University. After several years of practice, Jack finds that pedodontics has become an important part of his future, and goodness knows he couldn't choose a handsomer or better qualified teacher than Ruth! Good luck to you, Jack, and say hello to John Holland for us.

★ ★ ★

Mel Noonan, of our Michigan Unit, spoke to the members of the Framingham, Mass. Dental Society recently. Paul Sydow, his host, took Mel to Tufts for an afternoon with our friend Helmut Zander, where Mel was duly impressed by the ambitious program Helmut has set up.

★ ★ ★

Our Cleveland group has had several fine programs these past years, but none could top the meeting of May 22 when Tom Hill and his staff at the W.R. Dental Research Center presented a review of the caries research work being conducted all over the country. It was a gala and inspiring evening, as one would expect if Norm Denner had anything to do with it! Incidentally, the Cleveland Dental Society deserves a helping hand from all of us to establish the first Monday in February as National Children's Dental Health Day, a program they have observed for ten years. Speak to your local officers and urge them to give their support to proclaim this first Monday in February as National Children's Dental Health Day.

★ ★ ★

If you would like a beautiful little book to put on your waiting room table, drop a line to "The Junket Folks," Little Falls, N. Y., and ask for a copy of "Flibbity Jibbit." There is no charge if you mention our Journal.

★ ★ ★

The American Academy of Pedodontics will hold its Annual Meeting at Lincoln, Nebraska June 26, 27, 28. A fine program has been arranged by host Raf Ireland, and a large attendance is anticipated.

Items for *Around the Country* should be addressed to Dr. Paul Sydow, 140 Union Avenue, Framingham, Massachusetts, our new Editor for the year 1949-50.

A Simplified Pulpotomy Technique

PHILIP BURWASSER, D.D.S., Ph.D.*

Cleveland, Ohio

For the past two years we have been using a very simple pulpotomy technique which was devised for the benefit of our dental students. This method has the unique advantage of requiring no special set-up, so that the operator can do a pulpotomy without previously having to prepare a sterile kit. It has come to our attention that many dentists avoid doing pulpotomies because they do not wish to keep sterile kits lying unused in their cabinets for long periods of time. The procedure outlined below circumvents this objection for the following reasons:

1. The molten metal sterilizer, the most important feature of this method, will sterilize burs and instruments in 3 to 5 seconds and cotton pellets in ten seconds. This has been confirmed bacteriologically by Stewart & Williams.

(An electrically heated molten metal sterilizer is manufactured by the Vulcan Electric Company of Danvers, Mass., and costs about $15.00. The Star Dental Mfg. Co. of Philadelphia, Penna., markets a molten metal sterilizer which attaches over the gas flame of the dental unit. These sterilizers are essentially crucibles for keeping melotte metal in a molten state. One can readily be contrived from materials found in the average dental office.)

2. The procaine solution may be substituted safely for sterile saline solution. This has been tested clinically in our dental clinic and is corroborated by Glass and Zander's work, in which they used ordinary tap water.

The healthy pulp stump which is essential for a successful vital pulpotomy will easily resist the few organisms which may come in contact with it during the operation. The calcium hydroxide is used as it comes from the container. Mechanical cleansing plus swabbing with 70% alcohol or a similar disinfectant is sufficient to free the mixing slab of pathogenic organisms.

Over two years of clinical use of this technique in the dental clinic and by several practitioners in and around Cleveland has demonstrated its value.

*Assistant Professor, Pedodontics, Western Reserve University School of Dentistry.

Armamentarium

Local anaesthesia equipment
Rubber dam and accessory items
Contra-angle burs 557, 558, 559, 6, 8, 10
Cotton pliers
Excavators, medium and small
Mouth mirror and explorers
Plastic instruments
Mixing slab and spatula
Tincture of iodine
Epinephrine 1:1000
Cocaine
70% alcohol
$Ca(OH)_2$
Base cement and liquid
Molten metal sterilizer

Technique

A pre-operative x-ray is taken to determine the size of the pulp-chamber and to visualize the periodontal tissues.

The molten metal sterilizer is connected.

Local anaesthesia is administered. Mandibular and long buccal injections for the lower arch, buccal and palatal infiltration for the upper.

The rubber dam is applied, isolating *only* the tooth to be operated upon.

The tooth and surrounding rubber dam are swabbed with tincture of iodine.

With fissure burs a wide opening is made in the occlusal surface of the tooth in order to gain direct access to the pulp-chamber. The overlying dentin is removed until the pulp is closely approached. The tooth cavity and surrounding rubber dam field are again swabbed with iodine to remove enamel, dentin and temporary cement debris from the field.

A suitable fissure bur is placed in the handpiece and dipped into the molten metal for five seconds. From this point on, every bur, excavator, explorer or cotton pellet that is used in the tooth is sterilized *immediately* before use.

The roof of the pulp-chamber is completely removed with the sterile fissure bur.

If the patient feels pain, procaine solution may be injected directly into the pulp. If this is not sufficient, a few crystals of cocaine are placed over the pulp with a sterile instrument and allowed to dissolve in the blood.

A large round bur is placed in the handpiece and sterilized in the molten metal.

The bur is revolved slowly in the pulp-chamber and is moved to all corners so that the pulp is cut off at the level of the opening of the canals. A small cotton pellet is picked up with the pliers and held in the sterilizer for 10 seconds. A few drops of procaine are dropped on the pellet from the syringe. This wet dressing is used to clean the blood and debris from the pulp-chamber and simultaneously to arrest hemorrhage. The epinephrine in the procaine is usually sufficient, but epinephrine 1:1000 is sometimes necessary. Quite often the vaso-constriction incident to the anaesthesia, is enough to prevent hemorrhage.

A spoon excavator is sterilized and the pulp debris is removed from the chamber.

The spoons are resterilized each time just before use.

The pulp-chamber is irrigated with procaine solution on sterilized cotton pellets.

The chamber is dried with sterilized cotton pellets and is carefully examined in order to ascertain that all pulp remnants have been removed.

The slab is cleaned with 70% alcohol and the spatula is sterilized in the sterilizer.

A small amount of calcium hydroxide is mixed with a drop or two of procaine solution. The mix is carried into the tooth on a sterilized plastic instrument and is pressed down onto the pulp stumps with a sterilized dry cotton pellet. The dry cotton acts as a blotter and removes the excess procaine solution from the mix. The entire floor of the pulp-chamber is covered with calcium hydroxide.

A not too thin mix of base cement is placed over the $Ca(OH)_2$ dressing.

The permanent restoration may be inserted at this time or at a succeeding visit.

A post-operative x-ray is taken.

Radiographic checkups should be done every 4 to 6 months.

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Crescent's answer to your problem of matrix bands for primary teeth.

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No cutting or wedging discomfort.

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12 retainers and 20 bands per set—$1.75.

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